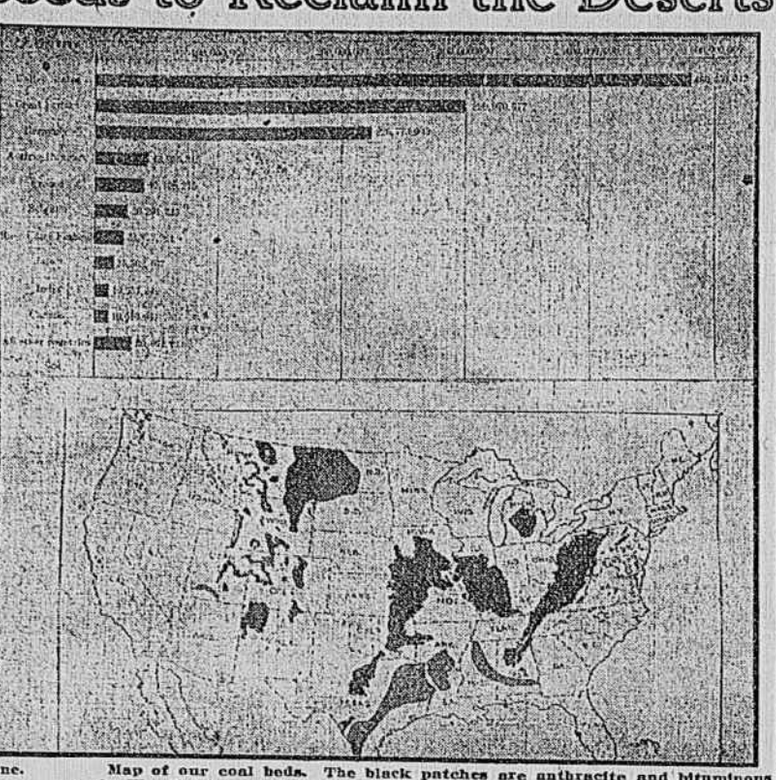
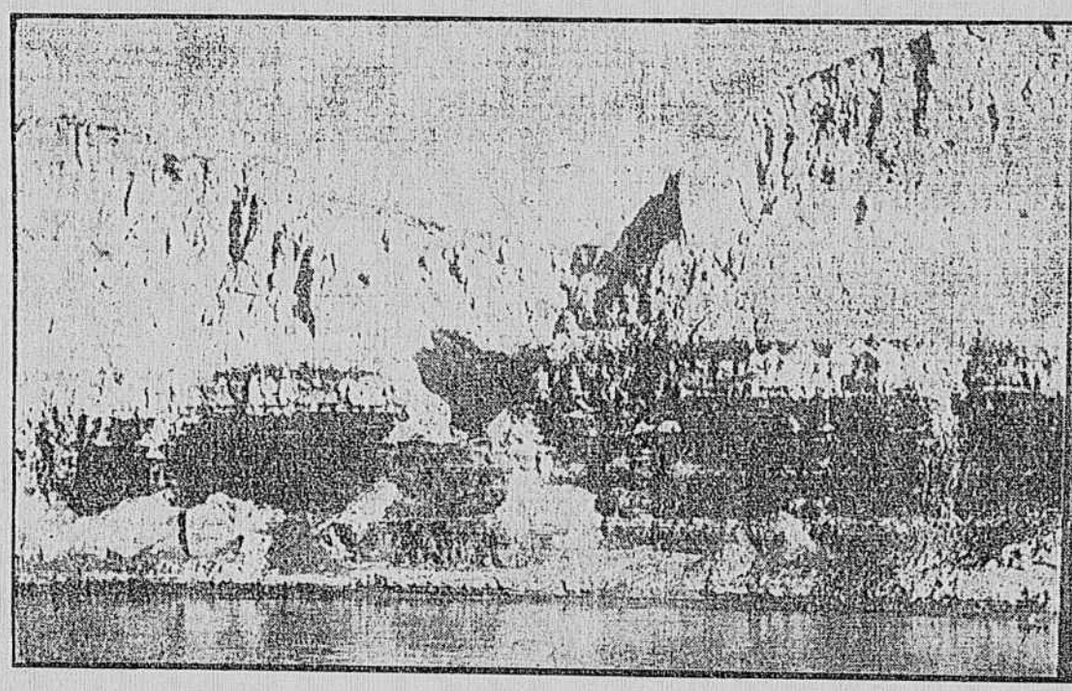
Uncle Sam's Coal Fields---How the Public Lands Are Being Prospected and Valued---Proceeds to Reclaim the Deserts

Uncle Sam still has 70,000,000 acres of coal lands. This shows seven-foot vein in bluffs of the Yellowstone.



Map of our coal beds. The black patches are anthracite and bituminous coal. The lighter patches are lignite. The diagram above the map shows comparative coal areas of the world.



A lignite bed in North Dakota as big as South Carolina.

THE DIRECTOR OF THE GEOLOGICAL SURVEY.

BY FRANK G. CARPENTER.

Washington, D. C.

I have spent this afternoon at the Geological Survey talking with Dr. George Otis Smith, the director, as to his new investigations of Uncle Sam's coalfields. His figures are so big that they dazzle the mind. The area of the known beds has been almost doubled within the past ten years; and it is now known to cover a territory twelve times as large as the States of Ohio, Virginia or Kentucky, or about one-sixth that of the United States proper.

Some of the new and undeveloped regions have beds thirty, forty, fifty, and even eighty feet thick, and one single bed contains five or six billion tons. In the whole United States, according to the estimate of Dr. Campbell, made for the survey, the coal in the beds is more than 3,000 billions of tons, and of this more than 2,000 billion tons are acessible and easily worked. Dr. Smith says that our workable coalfields are four times as large as those of all of the country combined, and that our tonage is twice as great as that estimated for the rest of the world.

Uncle Sam's Big Coal Wall.

You have heard of the great Chinese wall. I have seen it at several different places. It is about forty feet high, and perhaps twenty feet wide at the top. It begins at the Yellow Sea and runs across China for a distance of 1,500 miles. That wall would be a train of sand, or at best a single brick, compared with the mighty wall that might be made of Uncle Sam's coal. We shall estimate the amount at only 2,000 billions of tons, taking only the workable and accessible coal into the calculation. If that coal were out of the ground and laid up in solid masonry, it would make a wall one-third of a mile high and a mile thick reaching from New York to San Francisco. Or suppose it be 600 feet thick, which is more than three times the width of Pennsylvania Avenue in Washington, or that of any of the largest streets of our cities, and make the wall three times as high as the Washington Monument. We shall begin the construction at Boston and extend the wall westward. How far do you think it would go? Would it reach across the Pacific? Yes. It would extend from Boston to Shanghai in China, and from there over to the whole of Asia and Europe, until it met the Atlantic Ocean on the west coast of France. It would go on clear across that ocean to Boston, and there would be hundreds of billions of tons yet to spare.

But the Chinese wall was a useless attempt at defense to shut out the Tartars. This is a great industrial wall, which means the keeping our factories busy and our houses warm for three or four thousand years of ages to come.

This estimate of how long our coal will last is not Dr. Smith's. I tried to get him to tell, but he hedged. Said he:

"As reported by Mr. Parker, the survey coal statistician, the total production of coal in the United States up to date has been over eight billion tons, which, with the waste involved in mining, represents an exhaustion of about twelve billion tons. This is less than one-half of 1 per cent. of the coal now known to exist, and it leaves us more than 99 per cent. of our workable coal in the ground. The amount, as I have said, is about two thousand billion tons, which means four thousand times the amount we are now using each year, plus 50 per cent, added as waste."

A Million and a Half Tons Daily.

"How much coal do we use every year?"

"Our highest production was that of 1907, when we used 480,000,000 short tons. That was about a million and a half tons every day. We are now using a little less, but it would take more than 300,000 trains of thirty cars each to carry the coal that we are annually mining, and the combined length of those trains would be between eighty and ninety thousand miles. They would make a solid train of coal reaching two and one-half times around the globe at the equator."

"But, Mr. Director," said I, "if we use less than 500 millions tons a year, would not those 2,000 billions last us 4,000 years?"

"I don't want to talk about years, said the head of the Geological Survey, "but if any one wants to prophesy he can use those figures as a basis, keeping in mind the fact that the increase in consumption of our coal has been remarkable, and that in each decade the amount used has exceeded the total previous consumption since we began to mine coal. I mean to say, that the consumption for the ten years ending with last year was greater than the total consumption during the last century. If such a ratio of increase should continue, which is impossible, the life of our coalfields would be comparatively short."

Where the Coal Lies.

"Can you tell me just where our great coalfields are, Mr. Director?" said I.

"They are to be found in all but fourteen States of the Union. They extend from northern Pennsylvania to Oregon and from Canada to southernmost Texas. You can get the best idea of them from a map made for the survey by Dr. Campbell a couple of years or so ago."

Here the director sent for a map of our coal lands about four times as large as a page of this newspaper, and spread it out on his desk. As we looked at it, he said:

"That great patch at the east is the Appalachian coalfield, and those spots to the right of it, at its northern end, are the anthracite beds of Eastern Pennsylvania. It is from there that comes the chief anthracite of the country. Those beds originally contained over nineteen billion tons of anthracite and at the close of the year 1909 there were estimated to be over fifteen billion tons still in the ground. The Appalachian field contains much high-grade bituminous coal, good for coking, and it is by far the most important coalfield of the Union at the present time. A little further over is the eastern or Illinois coalbed. .. covers an area as large as the State of Ohio, and on the other side of the Mississippi is another vast region underlaid with cal, while at the south are the coalfields of Texas. Our surveyors have recently investigated the coalfields of the northwest and the Rocky Mountain plateau, and especially that upon the public lands, the title to which is still in the government."

What Uncle Sam Owns.

"Can you give me some idea of the coal lands which still belong to the government? What is their extent?"

"They cover an area of more than 70,000,000 or 80,000,000 acres, and they contain an enormous amount. Some of the beds are twenty, thirty, forty and even as high as eighty feet in thickness, and in many of them there are several beds with clay or rock between them. In the Navajo reservation of Arizona we have the Black Mesa coal field, which is estimated to contain more than 5,600,000,000 tons, or more than all the coal that Pennsylvania has produced or wasted up to date. Altogether it is estimated that there are almost 2,000,000,000,000 tons of coal of one kind or another in the public land States. It must be remembered that a great deal of this is lignite of such a low grade that it will be many years before it is mined."

"What is the character of the Western coal?"

"It is of all grades. Some of it is anthracite and some of it is high grade bituminous coal. We have considerable anthracite in Alaska, and also great quantities of bituminous coal which will make excellent coke, and which, eventually, will be used largely in the industrial development of the Pacific coast States."

How Uncle Sam Has Saved Millions.

"I understand that you geologists are resurveying and revaluing the coal upon our public lands? Can you tell me how this is done?"

"The old way of selling the coal lands," replied the director, "was at so much per acre, regardless of the quality or amount of coal it contained. The price was fixed at $20 if the land lay within fifteen miles of a railroad, or at $10 per acre if it were outside that limit. Our present method is to measure up the coal in each acre, and sell the land on a coal tonnage basis. Instead of getting $10 or $20 per acre we are now getting from $50 to $500 per acre, and some of the coal land will be worth more. Within the past two years the survey has classified more than 8,000,000 acres of coal in that way, and has placed a value upon them of $560,000,000.

This, added to what we have classified before, gives us over 13,000,000 acres already classified, the valuation of which in round numbers is $637,000,000. At the old rates those lands would have sold for at least $400,000,000 less, and the new valuations mean a gain to the government of about that amount. But this, you must remember, is the saving on only 13,000,000 acres, and we have sixty or seventy million acres which are yet to be priced."

Coal at One-Half Cent a Ton.

"But how can you fix the value of the coal?"

"We do that on a royalty basis. In the first place, we figure out how much coal each acre contains. A bed of coal one foot thick has about 1,500 tons to the acre, and if it is 40 feet thick it would contain 40 times that, or 72,000 tons to the acre. We valueit as low as half a cent a ton, and from that up to two or three cents a ton, according to the quality of the coal, whether it is alow-grade bituminous or a high-grade anthracite or coking bituminous.

"We test the actual heating value and base our estimates on that. Having estimated the value, we put the price on each acre, and we have now maps showing the values of coal lands on millions of acres. The maps are in townships, divided up into forty-acre tracts, the value of each of which has been carefully calculated. An acre of coal twenty feet thick would contain 36,000 tons, and this at one-half cent a ton would be valued at $180 supposing we considered the full amount of coal it contained. We estimate, however, at 1,000 tons instead of 1,800 tons to the acre foot, and the price of the twenty-foot bed would be on the basis of only 20,000 tons, making it cost $100 per acre instead of $180. If it were one cent a ton it would be $200 per acre, and if the bed were thicker or thinner it would be more or less. We have other allowances for waste and for the difficulty of mining.

Uncle Sam as a Coal Merchant.

"But, can the government lands be sold at these high prices?"

"We are selling them. During a single month at the Salt Lake City office we have received $200,000 for such lands, and additional claims were filed that month by would-be purchasers aggregating $260,000 more. The selling prices are fixed so that they will be attractive to the purchaser and at the same time will prevent the lands being bought and held. In order that the buyer may make a great profit out of the unearned increment thereon. The idea is to conserve the coal for the government and the people. The land office also issues patents for farm lands as homesteads, reserving the coal which lies beneath them.

"What sort of coal lands are the best investments?"

"At present the high-grade and more expensive lands are the better buys, although more of the low-priced lands are being sold. You see we have a considerable competition from the railways that have received large grants of public lands as subsidies, and some of which own vast quantities of coal. The Union Pacific road has extensive tracts of valuable coal lands. I would say that the railroads are not anxious to sell at the government prices, and that our prices are as a rule below those asked for private coal lanis in the same districts.

The Old Plan and the New.

"Can you give me an example of the old method of selling in contrast to the present plan?"

"Suppose we take one of the Wyoming coal fields," said the director. "Here is a township which at the old rate of from $10 to $20 per acre was valued at $460,000. It is now priced at 1 cent a ton acording to its coal contents, and the value is just $2,500,000, a difference of $2,340,000 for that township alone. In another township in Wyoming the present valuation of the coal lands is a little more than $8,000,000, whereas it was less than $500,000 before, and a single square mile of that township had been valued at $216,000."

Surveying the Coal.

"But how can your surveyors know just what coal there is in the land? Do they use diamond drills and bore down through every acre?"

"No," replied the director. "They can tell from the outcroppings of the coal on the mountains and hills, and the veins exposed in the canyons and valleys. If there is a bed of coal twenty feet thick in one canyon and we find a bed of the same thickness and same quality of coal some distance away with the other geological conditions that would show that the two were a part of one and the same bed, we should conclude that all the land between the two contained coal. Our estimates are carefully made, and as a rule they are below rather than above the real amounts."

The Depth of Coal Beds.

"How deep do you fix the possibility of mining?"

"We estimate that at about 3,000 feet," replied the director. "I mean for coal. The lignite is estimated at about one-third that depth."

"How about lignite, is it of great value?"

"It will probably be worth far more in the future than it is now. We have altogether in the neighborhood of 150,000 square miles, containing about 300,000,000,000 tons of lignite, which is easily accessible. There are vast beds of lignite in Northern Dakota, covered over with rich farming lands, and there are great beds in the south, including Texas and other Gulf States. We have a lignite bed in North Dakota which is as big as the whole State of South Carolina. Its contents are estimated at something like 500,000,000,000 tons. Montana and New Mexico have large deposits of lignite and there are billions of tons of it in Alaska.

Lignite Briquettes for the Railroads.

"But have we had any practical tests of the value of lignite?"

"It is used largely in Europe," replied the director of the survey. "Germany consumes 15,000,000 tons of it annually, and in the shape of briquettes it is consumed on many of the European railroads. It is also employed there for domestic heating and gas-making.

Briquettes have been used experimentally on some of our roads, and we have a number of factories which are now making them. The briquettes burn without clinkers, and I have seen it estimated that if they should be substituted for coal on the railroads, the saving in our coal consumption would be something like 30,000,000 tons per annum. The Geological Survey has been making experiments as to briquette manufacture, and we have machines which will exert a pressure of 28,000 pounds to the square inch, forcing the lignite into briquettes without the aid of a binder, such as pitch or some other substance. Lignite coal can be used for gas-making, and it will in time form a large source of fuel supply for gas engines."

The Coal Lands and the Deserts.

"What will be done with the money that the government gets from its coal lands?" I asked.

"That is a very interesting feature in connection with the revaluation," said the director. "The greater part of the government coal lands lies in the States which are reclaiming the deserts, and this money will go to the reclamation fund. It will be used to make reservoirs in the mountains, dams for the rivers and canals to carry the water out over the land. It will enormously increase the area of irrigated land and will eventually result in the creation of thousands of farms. So far the proceeds of the coal lands have all been deposited to the credit of the irrigation reclamation fund."